REMARKS

An Excess Claim Fee Payment Letter is attached hereto to cover the cost of four (4) excess total claims.

Claims 19-52 and 119-131 are all the claims presently pending in the application. Claims 19 and 20 have been amended to more particularly define the claimed invention. Claims 128-131 have been added to claim additional features of the claimed invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 19-52 and 119-127 stand rejected under 35 U.S.C. §102(b) as being anticipated by Sayyah, et al. (Published in Journal of Crystal growth 77 (1986) pp 424-429). Claims 37-52 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Sayyah, et al. and the alleged Admitted Prior Art.

These rejections are respectfully traversed in the following discussion.

I. EXEMPLARY ASPECTS OF THE CLAIMED INVENTION

Applicant notes that the features of the exemplary aspects of the claimed invention which are described in this Amendment pertain only to the claimed invention of the present Application. These features are not necessarily included in other aspects of the invention and, therefore, the description of such features in this Amendment should in no way be considered as limiting other aspects of the invention which may be the subject of other patents or patent applications.

An exemplary aspect of the claimed invention (e.g., as recited in claim 19) is directed to a method for producing a gallium nitride group compound semiconductor by using an organometallic compound vapor phase epitaxy. The inventive method includes setting a mixing ratio of a silicon-containing gas to at least one other raw material gas at a desired value in a range over which a conductivity of the gallium nitride group compound semiconductor increases substantially proportionally with the mixing ratio so as to obtain a desired conductivity (1/resistivity) of the gallium nitride group compound semiconductor, and

forming a first gallium nitride group compound semiconductor layer by feeding the silicon-containing gas and the at least one other raw material gas at the mixing ratio.

In another exemplary aspect (e.g., as recited in claim 20), the inventive method includes setting a mixing ratio of a silicon-containing gas to at least one other raw material gas at a desired value in a range over which a carrier concentration of the gallium nitride group compound semiconductor increases substantially proportionally with the mixing ratio so as to obtain a desired carrier concentration of the gallium nitride group compound semiconductor, and forming a first gallium nitride group compound semiconductor layer by feeding the silicon-containing gas and the at least one other raw material gas at the mixing ratio.

Importantly, these exemplary aspects of the claimed invention (e.g., the aspects of claims 19 and 20) include forming a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of the first gallium nitride group compound semiconductor layer, without feeding the silicon-containing gas.

Conventional methods of forming a gallium nitride group compound semiconductor cannot control the conductivity of the gallium nitride group compound semiconductor.

The claimed method, on the other hand, forms a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of the first gallium nitride group compound semiconductor layer, without feeding the silicon-containing gas. That is, the claimed method can control the conductivity of the gallium nitride group compound semiconductor (e.g., by controlling the flow rate of the silicon containing gas).

III. THE PRIOR ART REFERENCES

A. The Sayyah Reference

The Examiner alleges that Sayyah teaches the invention as recited in claims 19-52 and 119-127. Applicant submits, however, that there are elements of the claimed invention that are not taught or suggested by Sayyah.

However, Applicant submits that Sayyah does not teach or suggest *"forming a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of said first gallium nitride group compound semiconductor layer, without*

feeding said silicon-containing gas", as recited, for example, in claims 19-20.

As noted above, unlike conventional methods of forming a gallium nitride group compound semiconductor which cannot control the conductivity of the gallium nitride group compound semiconductor, the claimed method forms a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of the first gallium nitride group compound semiconductor layer, without feeding the silicon-containing gas. That is, the claimed method can control the conductivity of the gallium nitride group compound semiconductor (e.g., by controlling the flow rate of the silicon containing gas) (Application at page 15, line 17-page 16, line 10; page 28, line 1-page 29, line 4; Figure 26).

Clearly, these novel features are not taught or suggested by Sayyah. Indeed, Applicant would point out that Sayyah only discloses using silane gas for growing AlGaN. Sayyah may disclose that Si is a shallow donor. However, Sayyah never measures electron concentration. Indeed, on page 135, line 18 to page 138, line 10, Sayyah discloses as follows:

(1) Conductivity is never changed by doping Si
In other words, even by increasing Si doping concentration, electron concentration never increased, and

(2) Sayyah considers the possibility that this is caused by Si preventing electrons from being exciting into a conduction band.

Applicant notes that this has been brought to the attention of the Examiner (e.g,. see page 5 of the Response filed on September 21, 2004), however the Examiner has never attempted to comment on this passage.

Applicant respectfully submits that the Examiner's position is **irrefutably irreconcilable** with this passage in Sayyah. Therefore, Applicant respectfully requests that, should the Examiner not agree that this case is in condition for allowance, she should fully explain in a next Office Action how she believes that her position can be reconciled with this passage of Sayyah.

Indeed, Applicant would point out that on page 135, Sayyah discloses that the conductivity of the AlGaN samples had not changed although it had been measured. That is, Sayyah teaches clearly and irrefutably, that silane flow rate cannot be used to control conductivity. Thus, clearly Sayyah does not recognize the claimed invention.

Therefore, Applicant submits that Sayyah does not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. The Alleged Admitted Prior Art (APA)

The Examiner alleges that Sayyah would have been combined with the alleged Admitted Prior Art to form the invention of claims 37-52. Applicant submits, however, that these references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention.

Applicant respectfully submits that these references would not have been combined as alleged by the Examiner. Indeed, the APA is unrelated to Sayyah, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

Moreover, Applicant respectfully points out that MPEP §2142 states that to establish a prima facie case of obviousness, **the Examiner must identify some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Further, the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on applicant's disclosure** (MPEP §2142 citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

In fact, the Examiner has never identified any motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, these references clearly do not teach or suggest their combination.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Sayyah nor the alleged Admitted Prior Art, nor any combination

thereof teaches or suggests *"forming a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of said first gallium nitride group compound semiconductor layer, without feeding said silicon-containing gas"*, as recited, for example, in claims 19-20.

As noted above, unlike conventional methods of forming a gallium nitride group compound the claimed method forms a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of the first gallium nitride group compound semiconductor layer, without feeding the silicon-containing gas. That is, the claimed method can control the conductivity of the gallium nitride group compound semiconductor (e.g., by controlling the flow rate of the silicon containing gas) (Application at page 15, line 17-page 16, line 10; page 28, line 1-page 29, line 4; Figure 26).

Clearly, these novel features are not taught or suggested by the alleged APA. Indeed, Applicant would first point out that the Examiner is not relying on the alleged APA as allegedly teaching this feature but instead merely relies on the APA as allegedly teaching growing a GaN based layer on a GaN based buffer layer.

In fact, nowhere does the alleged teach or suggest forming a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of the first gallium nitride group compound semiconductor layer, without feeding the silicon-containing gas. Thus, the alleged APA clearly does not make up for the deficiencies of Sayyah.

Therefore, Applicant submits that these references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 19-52 and 119-131 all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 4/24/05

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